

Claims

1. A method for patterning cells, comprising:

shielding a first portion of a surface of an article with a masking system comprising a cohesive mask in conformal contact with the surface of the article;

applying an agent through a channel within the masking system to a second portion of the surface of the article while preventing application of the agent to the first portion of the surface of the article; and

applying cells onto the agent.

2. The method of claim 1, wherein the masking system comprises a flexible mask including a first surface and an opposing second surface, and the channel is one of a plurality of channels passing through the mask and connecting the first surface with the second surface.

3. The method of claim 2, further comprising removing the masking system from the surface of the article.

4. The method of claim 1, wherein the agent is a cell-adhesion promoter.

5. The method of claim 2, further comprising removing the masking system from the surface of the article prior to the step of applying cells onto the agent.

6. The method of claim 5, wherein the agent is a first agent and the method further comprises adding a second agent to the first portion of the surface.

7. The method of claim 6, wherein the first agent is a cell-adhesion promoter.

8. The method of claim 7, wherein the first agent is a protein.

9. The method of claim 8, wherein the protein is fibronectin.

10. The method of claim 6, wherein the second agent is a cell-adhesion inhibitor.

11. The method of claim 1, wherein the first portion of the surface of the article is contiguous with the second portion.

5 12. The method of claim 2, wherein the agent is a first agent and the method comprises pre-coating at least a portion of the masking system with a second agent prior to the shielding step.

10 13. The method of claim 12, wherein the pre-coating step comprises:  
contacting the first surface of the masking system with a substrate; and  
coating the second agent onto the second surface and the plurality of channels of the masking system, wherein the first surface of the masking system is free of the second agent.

15 14. The method of claim 13, wherein the shielding step comprises:  
removing the masking system from the substrate; and  
bringing the first surface of the masking system into conformal contact with the first portion of the surface of the article.

20 15. The method of claim 14, wherein the first agent is a cell-adhesion promoter.

16. The method of claim 15, wherein the second agent is a cell-adhesion inhibitor.

25 17. The method of claim 16, further comprising removing the masking system from the surface of the article prior to applying the cells onto the first agent.

18. The method of claim 16, further comprising removing the masking system from the surface of the article.

30 19. The method of claim 18, further comprising adding a third agent to the first portion of the surface of the article.

20. The method of claim 19, further comprising allowing the cells applied to the first agent to spread onto the third agent.

5 21. The method of claim 19, wherein the first agent is a first cell-adhesion promoter and the third agent is a second cell-adhesion promoter.

22. The method of claim 21, further comprising adding cells of a second type to the third agent.

10 23. The method of claim 1, wherein the channel has a dimension for controlling the growth of a single cell.

24. A method for patterning cells, comprising:  
shielding a first portion of a surface of an article with a masking system comprising a  
15 cohesive mask in conformal contact with the surface of the article;  
applying a cell-adhesion inhibitor through a channel within the masking system to a  
second portion of the surface of the article while preventing application of the cell-adhesion  
inhibitor to the first portion of the surface of the article.

20 25. The method of claim 24, further comprising removing the masking system from the surface of the article.

26. The method of claim 25, further comprising applying a cell-adhesion promoter to the second portion.

25 27. The method of claim 26, further comprising depositing cells onto the cell-adhesion promoter.

30 28. A method for patterning cells, comprising:  
shielding a first portion of a surface of an article with a masking system comprising a  
cohesive mask in conformal contact with the surface of the article;  
applying a cell-adhesion promoter through a channel within the masking system to a

second portion of the surface of the article while preventing application of the cell-adhesion promoter to the first portion of the surface of the article.

5 29. The method of claim 28, further comprising removing the masking system from the surface of the article.

30. The method of claim 29, further comprising adding an agent to the first portion of the surface of the article.

10 31. The method of claim 30, wherein the agent is a cell-adhesion inhibitor.

32. The method of claim 30, wherein the cell-adhesion promoter is a first cell-adhesion promoter and the agent is a second cell-adhesion promoter.

15 33. The method of claim 32, further comprising depositing cells of a first type onto the second cell-adhesion promoter, and depositing cells of a second type onto the first cell-adhesion promoter.

20 34. The method of claim 28, further comprising pre-coating the masking system with a cell-adhesion inhibitor prior to the shielding step.

25 35. A method for patterning cells, comprising:  
providing an article having a first pattern of cells of a first type; and  
applying an agent to a portion of the surface of the article, the portion being  
contiguous with the first pattern.

36. The method of claim 35, wherein the agent is a cell-adhesion inhibitor for cells of the first type

30 37. The method of claim 35, wherein the agent is a cell-adhesion promoter for cells of a second type.

38. The method of claim 37, further comprising applying the cells of the second type onto the agent.

39. The method of claim 35, wherein the providing step further comprises:

5 bringing a masking system in conformal contact with the portion of the surface of the article; and

applying a cell-adhesion promoter through a channel within the masking system.

40. The method of claim 39, wherein the providing step further comprises pre-coating the  
10 masking system with a cell-adhesion inhibitor prior to the step of bringing the masking system in conformal contact with the surface of the article.

41. An article comprising:

15 a first pattern of cells of a first type contiguous with a second pattern of cells of a second type.

42. A method comprising:

shielding a first portion of a surface of an article with a masking system;

20 allowing a cell-adhesion promoter to be applied to a second, unshielded portion of the surface of the article while preventing application of the cell-adhesion promoter to the first portion of the surface of the article with the masking system;

applying a cell to the second portion of the surface.

43. A method as in claim 42, comprising applying the cell to the second portion of the  
25 surface after removal of the masking system from the surface.

44. A method as in claim 42, comprising applying the cell to the second portion of the surface prior to removal of the masking system from the surface.

30 45. A method for patterning cells, comprising:

shielding a first portion of a surface of an article with a polymeric masking system;

applying an agent through a channel within the masking system to a second portion of


$$\begin{array}{ccccccc} \mu_1^{(m)} & \mu_2^{(m)} & \dots & \mu_{n-1}^{(m)} & \mu_n^{(m)} & m+1 & \dots & n \\ \mu_1^{(m-1)} & \mu_2^{(m-1)} & \dots & \mu_{n-1}^{(m-1)} & \mu_n^{(m-1)} & m & \dots & n \\ \vdots & \vdots & & \vdots & \vdots & \vdots & & \vdots \\ \mu_1^{(1)} & \mu_2^{(1)} & \dots & \mu_{n-1}^{(1)} & \mu_n^{(1)} & 2 & \dots & n \\ \mu_1^{(0)} & \mu_2^{(0)} & \dots & \mu_{n-1}^{(0)} & \mu_n^{(0)} & 1 & \dots & n \end{array}$$